

آرک شفا نزار دہلوی

$$(1 + 4 + 0 + 0 + \dots)(2 + 4 + 0 + \dots) : 1 \times 4 \rightarrow 2 \quad (1)$$

$$\sqrt{1+\sqrt{5}} = \sqrt{(1+\sqrt{5})^2} = \sqrt{1+2\sqrt{5}}$$

(الف)

$$\sqrt{\frac{1}{(1+\sqrt{5})}} = \sqrt{2}$$

$$\left(\sqrt{3-\sqrt{5}} - \sqrt{3+\sqrt{5}} \right)^2 : 3 - \sqrt{5} + 3 + \sqrt{5} - 4 = 2$$

$$\left(\frac{\sqrt{3+\sqrt{5}}}{\sqrt{3-\sqrt{5}}} \right)^2 : \frac{3+\sqrt{5}}{3-\sqrt{5}} \times \frac{1}{2} \rightarrow \frac{1}{\sqrt{2}}$$

$$\frac{1}{\sqrt{2}} \times -\sqrt{2} = -1$$

$$\frac{2\sqrt{2} + 3\sqrt{3}}{5 - \sqrt{6}} = \frac{2}{\sqrt{2}-1} \cdot \frac{\sqrt{2}+1}{\sqrt{2}+1} = \frac{2\sqrt{2}+2}{2} = \sqrt{2}+1$$

$$\frac{2}{\sqrt{2}-1} \times \frac{\sqrt{2}+1}{\sqrt{2}+1} = \frac{2\sqrt{2}+2}{2} = \sqrt{2}+1$$

$$\frac{2\sqrt{2} + 3\sqrt{3}}{5 - \sqrt{6}} \times \frac{5 + \sqrt{6}}{5 + \sqrt{6}} = \frac{10\sqrt{2} + 3\sqrt{3} + 15\sqrt{3} + 9\sqrt{2}}{25 - 6} = \frac{19\sqrt{2} + 19\sqrt{3}}{19} = \sqrt{2} + \sqrt{3}$$

$$\frac{\sqrt{3}-1}{4+\sqrt{3}} + \frac{1}{2-\sqrt{3}} = \sqrt{3}-1+2+\sqrt{3} = 2\sqrt{3}+1 \quad (-)$$

$$\frac{\sqrt{3}-1}{4+\sqrt{3}} \times \frac{4-\sqrt{3}}{4-\sqrt{3}} = \frac{12-9-4+\sqrt{3}}{13} = \frac{12\sqrt{3}-13}{13} = \sqrt{3}-1$$

$$\frac{1}{2-\sqrt{3}} \times \frac{2+\sqrt{3}}{2+\sqrt{3}} = \frac{2+\sqrt{3}}{1}$$

$$\frac{\sqrt{1+\sqrt{3}}+\sqrt{\sqrt{3}-1}}{\sqrt{\sqrt{3}-2}} = 2 = \sqrt{4} = \boxed{4} \quad (4) \text{ الف}$$

$$\left(\frac{\sqrt{1+\sqrt{3}}+\sqrt{\sqrt{3}-1}}{\sqrt{\sqrt{3}-2}} \right)^2 = \frac{1+\sqrt{3}+\sqrt{3}-1+2\sqrt{2}}{\sqrt{3}-\sqrt{2}} = \frac{2(\sqrt{3}+\sqrt{2})}{\sqrt{3}-\sqrt{2}} \times \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}+\sqrt{2}} = \frac{2(\sqrt{3}+\sqrt{2})}{1}$$

$$\Rightarrow \sqrt{2(\sqrt{3}+\sqrt{2})} = \sqrt{4}+2$$

$$\left(\frac{n}{r} \right)^{\frac{1}{r}} \times \sqrt[n]{n \times r} \times r \sqrt{r} \quad (-)$$

$$r^{\frac{1}{r}} \times r \times r^{\frac{1}{r}} \times r \times r^{\frac{1}{r}} = r \times r \times r = \boxed{12}$$

$$\frac{r^n}{1+r+9r^2+r^3+r^4+r^5} = \frac{r^n \times 1}{r} \times \frac{1}{(r^4-1)} = \frac{r^n \times 1}{r} \times \frac{1}{(r^2-1)(r^2+1)} = \frac{r^n}{r} \times \frac{1}{(r-1)(r+1)(r^2+1)}$$

$$\frac{r^n}{r^2(r^{-2}+r^{-1}+1+r+2+r^2+1)} = \frac{r^n \times 1}{r} \times \frac{1}{r} \times \frac{1}{(r^2-1)} = \frac{r^n}{r} \times \frac{1}{r} \times \frac{1}{(r-1)(r+1)}$$

$$\Rightarrow \frac{r^n}{r^n} \times \frac{1}{9} = \left(\frac{r}{r} \right)^n \times \frac{1}{9} = \frac{1}{9} \quad \text{م}$$

$$\begin{aligned}
 & (a^2 + b^2 - 2ab)(a^2 + b^2 + 2ab)(a-b)^2(a+b)^2 \\
 & = (a^2 - b^2)^2 + ((\sqrt{2}-1 - \sqrt{2}+1))^2 + (2\sqrt{2} - 2\sqrt{2})^2 + (2(\sqrt{2}-1))^2 \\
 & = 4(\sqrt{2}-1)^2 + 4(1+2-2\sqrt{2}) + 4(1-2\sqrt{2}) + 14(2-2\sqrt{2}) \\
 & = 4(2-2\sqrt{2}) + 4(14)
 \end{aligned}$$

$$\begin{aligned}
 & (a + \frac{1}{a} + \sqrt{2})(a + \frac{1}{a} - \sqrt{2}) \cdot ((a + \frac{1}{a})^2 - 2)^2 \\
 & = (a^2 + \frac{1}{a^2} + \cancel{2} - \cancel{2})^2 \cdot (a^2 + \frac{1}{a^2})^2 = a^2 + \frac{1}{a^2} + 2 + \sqrt{2} - \frac{1}{\sqrt{2}} + 2 \\
 & \frac{9\sqrt{2} - 24\sqrt{2} + 1 + 12 - 12\sqrt{2}}{\sqrt{2} - 2\sqrt{2}} = \frac{112 - 48\sqrt{2}}{\sqrt{2} - 2\sqrt{2}} = \frac{14(\sqrt{2} - 2\sqrt{2})}{\sqrt{2} - 2\sqrt{2}} = 14
 \end{aligned}$$

$$\begin{aligned}
 & A = (x^2 \times x^{\frac{1}{2}})^{\frac{1}{2}} \times x^{\frac{1}{2}} \times (x^{\frac{1}{2}})^{\frac{1}{2}} \times x^{\frac{1}{2}} \times x^{\frac{1}{2}} \times x^{\frac{1}{2}} \times x^{\frac{1}{2}} \\
 & \Rightarrow \sqrt[3]{1-1} = \sqrt[3]{\frac{1}{1}} = \boxed{\frac{1}{1}}
 \end{aligned}$$

$$\begin{aligned}
 & a^{\frac{1}{2}} = x^{\frac{1}{2}}(a^{\frac{1}{2}}) \Rightarrow \frac{a^{\frac{1}{2}}}{a^{\frac{1}{2}}} = a^{\frac{1}{2}} = \sqrt{a} \Rightarrow a = \sqrt{a} \\
 & \Rightarrow a^2 = \frac{1}{\sqrt{a}} \Rightarrow a = \frac{1}{\sqrt[3]{a}} \\
 & \frac{3\sqrt{2}-1}{1+\sqrt{2}} \cdot \frac{3(\sqrt{2}-1)}{(1+\sqrt{2})(1-\sqrt{2})} \cdot \frac{3(1-\sqrt{2})}{-2} \cdot \frac{3(2-2\sqrt{2})}{2} \cdot \frac{3(2-\sqrt{2})}{2} \\
 & = 4 - 3\sqrt{2}
 \end{aligned}$$

$$\underbrace{\sqrt{m+a}}_m - \underbrace{\sqrt{m-f}}_n = r \Rightarrow m-n=r$$

(10)

$$\Rightarrow m^r - n^r = (m/n)(m+n) = m+a - m+f = a+f$$

$$r(m+n) = a+f \Rightarrow m+n = \frac{a+f}{r}$$

$$\Rightarrow \sqrt{m+a} - \sqrt{m-f} = r \Rightarrow m+n-r = \frac{a+f}{r} - \frac{f}{r}$$

$$\boxed{\frac{a}{r}}$$